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ABSTRACT

Information is essential to the functioning of society, and there are many exciting opportunities for information professionals in the future. These professionals must be prepared to meet the need for excellence in their field. Information professionals generally fall within one of two categories: those who support the creation and preparation of information and those who assist in using information. There has been a phenomenal growth in the information sector, and the level of librarian employment is also growing. Factors affecting the information profession include the growth of an information hungry population, the information explosion, the increase in usage of libraries, and the growing range of library services. Different career paths in the information profession have also developed, as exemplified by the information scientist and the librarian. Leadership in companies in the next 25 years will come from the information profession, particularly those engaged in information resource management. Librarians must make everyone aware of their true contribution to society and, as professionals, must maintain reasonable expectations of what their careers can bring in terms of position and remuneration. Scholars, researchers, educators, and professionals must all be involved in the continued attempt to achieve excellence in the information profession. (ESR)

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The Imperative for Excellence in the Information Profession

The 1983-84 Stallman Lecture

Donald W. King

U.S. DEPARTMENT OF EDUCATION
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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

What an exciting time we live in! And, we as information professionals are at the very forefront of the new frontier of the information age. Information is a strange beast in that we have not been able to arrive at a consensus as to what it really is. What we do know is that information is similiar to food, air and other necessities of life in that we, as humans, can not function well without it. Yet, we frequently take ~~it~~ INFORMATION for granted. We overlook how essential information is to nearly every facet of our lives. Information is the principal resource used for meeting all our personal needs such as in keeping ~~information~~ informed; coping with day-to-day problems; dealing with life's traumas such as death, divorce, illness and drug addiction; it is important in supporting our religion, cultural heritage and family life; and in accomodating our recreation, entertainment and leisure-time activities. Information is the essence of life long learning; whether during pre-school age, through formal education and continuing through our work life or on into retirement years. As many Nations pass from the industrial age into the information age we find that a majority of our work force is involved in information related activities and that most ~~persons~~ PEOPLE rely heavily on information to perform their work, or they process information as their principal work activity. Information is the basis ~~of~~ FOR governing societies. How could a democracy survive without

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a well informed populace. Governments, such as in the U.S., spend billions of dollars in generating, processing and using information. In fact, there are few functions performed by governments that are not dominated by information. Finally, we find that information plays an extremely important role in international exchange, cooperation and understanding.

It has been estimated that the U.S. population consumes about 7 trillion words a day through electronic media (e.g., radio and television) and print media (i.e., newspapers, books and magazines). However, the NUMBER OF words made available ~~are~~ IS growing much more rapidly ~~(8.9% per year)~~ than the words consumed ~~(2.9% per year)~~ thus yielding a glut of information. THE GROWTH OF OUTPUT IS 8.9% PER YEAR COMPARED WITH A CONSUMPTION RATE OF 2.9% Even though words distributed and used through electronic media are clearly replacing the printed media, it is believed that this is LARGELY "news" and recreational information provided through television and radio. Information used for professional and other purposes seems to still rely HEAVILY on the printed media. For example, publishers distribute nearly 3.0 billion copies of scientific and technical journal articles each year in the U.S., and the amount of information generated, distributed and used is growing at about the same rate as the number of scientists and engineers. It is thought that other professions also experience the same trends. The U.S. population in general continues to consume about 1.5 trillion words per day from printed media.

The United States, and most industrial nations, have experienced a movement from an Agricultural Age to an Industrial Age and now to AN Information Age. About one hundred years ago five percent of the workforce was engaged in the information sector and this proportion

grew to about one-third in the 1950's and is estimated to be over one-half at the present time in the U.S. This is truly a phenomenal occurrence with substantial implications to our economy, employment structure, social behavior and our well being. Yet the same phenomenon seems to be ~~happening~~ APPARENT in other industrial nations as well, ALTHOUGH TO A LESSER DEGREE. For example, in Japan the information sector grew from 18 percent of the workforce in 1960 to 30 percent in 1975 and in the United Kingdom the growth was from 27 percent in 1951 to 36 percent in 1971.

Information has become such an integral part of our lives, that sometimes we lose sight of its importance, how we actually get information, and who is responsible for its accuracy, production, distribution, maintenance and access. A subliminal information community has arisen to help feed the enormous AND EVER-INCREASING appetites of information users. The information community is made up of many institutional participants such as publishers, information clearinghouses, educational institutions, broadcast companies, libraries and information units that serve information creators, processors and users. There are estimated to be about 2 million information professionals who work in these places. These are professionals who spend the greatest proportion of their professional time in organizing, or processing information on behalf of others. The information professions also include people who manage information programs; perform information research, development, and technology; or educate or train information workers and users. As students in the information profession, there is a wealth of exciting opportunities for you. *Let me describe them briefly.*

In many work environments, the team approach has led to information related activities to be allocated to specific individuals such as technical writers and information analysts. As such, two categories of information professionals emerged; one to support the creation and preparation of information, and another to assist in using information. In the former instance, there are nearly 50 thousand information professionals engaged in the U.S. in technical writing, speech writing, editing, preparing graphic materials and other such activities. They also include translating business, scientific or technical works from one language to another. Many of these professionals deal with numeric information in etsablishing ~~computer~~ numeric input requirements FOR AUTOMATION, transforming data into a form required by computer systems, operational systems or libraries. They are also involved with the creation and preparation of other information materials, such as audiovisual or cartographic materials. Not included in the number of information professionals above are reporters who observe news and other events and report those events in magazines and newspapers, or have their observations reported on the radio or television.

There are estimated to be ~~260 thousand~~ OVER A QUARTER OF A MILLION information professionals who analyze data and information on behalf of others. These are ~~persons~~ PEOPLE who research and analyze data and information from libraries, computer files and other databases for scientists, lawyers, doctors and the like. They often extract and summarize previously written materials, computer system output, or library materials, but they don't actually use the information themselves. These people work in libraries, information centers, and a relatively new kind of organization called information analysis centers. The federal

government funds nearly two hundred information analysis centers that serve highly specific sub-disciplines such as materials properties, health planning, and nuclear wastes. Other places of work include financial units, management information units, research units and the like. The titles of these information professionals usually reflect either the profession that they serve such as engineer, hydrologist, economist or the place in which they work such as librarian or computer scientist.

In order to accomodate the vast amount of information needs, an extensive information profession has developed in recording, reproducing and distributing information. We estimate that there are 180 thousand information professionals, found in industry, government, and universities, who are not only concerned about information provided by publishers in printed media and broadcasters in the electronic media, but also text, numeric, graphic and cartographic information found in PRINTED AND electronic media as well. These information professionals are concerned about acquiring information, editing or transforming it, recording it in a usable way, and providing it through printed copies, broadcasts, or electronic disks, tapes, and other media.

Similarly, many people are engaged professionally in storing and providing access to information. Libraries have traditionally served as the means of storing and providing access to information in recorded form. There are ~~over~~ about 140 thousand professional librarians in the U.S. who are now concerned with acquiring, circulating, storing, and providing access to information in nearly all conceivable information forms. In addition to the traditional library settings

we have about 140 thousand information professionals who perform similar activities in archives, medical records units, word processor and computer system units, and units that are concerned with special collections in science, finance, marketing, and ~~the like~~ so on. It is this sector of the information profession that is growing most rapidly.

One wonders why, in light of the phenomenal growth of information and the information sector, ~~the~~ growth of the library community appears to be lagging, there are those in the library community who spell "doom and gloom" for librarianship. The library field is simply not doing as badly as many suggest. A recent study by us shows that the amount of librarian employment grew 8 percent in the four years 1978 to 1982. This represents a growth of about 1.6 percent per year, which may seem very low. Yet, when further analyzed is not as bad as it appears. The growth of the information sector (mentioned previously) during the 1960's was only 3 percent per year. It was found that the growth in the number of librarians closely follows the growth in the number of constituents whom they serve. For example, the number of public librarians grew about 3.3 percent from 1978 to 1982; whereas the population in the U.S. increased 4.3 percent during that time. The number of academic librarians grew 6.5 percent, which is somewhat greater than the growth of student enrollment (2.2%) during this period. Similarly, the increase in the number of school librarians seems to be greater than enrollment: 2.0 percent increase in librarians compared to 5.6 percent decrease in enrollment in public schools and 33 percent versus zero percent growth in non-public schools. The number of special librarians has increased a healthy 19.2 percent in the time period 1978 to 1982. ~~One~~ Some of the constituents of special librarians ~~is~~ are scientists and engineers, and the number in these professions has grown 19.7 percent during the same period.

ONE OF THE REASONS FOR THIS IS THE EXPANDING ROLE OF THE SCHOOL LIBRARY TO BECOME LEARNING CENTRES AND EDUCATIONAL TECHNOLOGY CENTERS.

Therefore, from the standpoint of the constituents served, one should not be surprised at the rate of growth of librarianship.

One problem is that the number of consituents served probably is the criterion PROBABLY USED MOST OFTEN used to set library budgets. This simplistic way of looking at things ignores some of the hard facts of library service:

(1) The LIBRARY information users are Becoming more INFORMATION information intensive users (per capita consumption of words is growing 1.2 percent per year).

(2) The amount of words produced is growing about 9 percent per year or double every seven years. Traditionally library materials doubled every fifteen or so years. Thus, libraries must store and provide access to an increasing enormous accumulation of materials.

(3) The information hungry population is demanding larger collections as well as more kinds of services.

(4) Not only is the collection size of traditional materials rapidly increasing, but more types of information materials are desired by users (e.g., government documents, computer tapes, etc.) and being generated by the producers.

(5) Libraries are being asked to provide access to new technology (e.g., online terminals) as well as information materials.

It is for these reasons that libraries have felt the economic tightening more than some of the other institutions. However, THE library COMMUNITY ~~have~~ WAS reacted marvelously well in coping with these problems.

In order to achieve economical services or produce more services with relatively fixed budgets, librarians have been highly resourceful through networking, employing new technology and reallocating resources to optimize services. In order to provide more extensive services, libraries have begun to reallocate budgets from materials to other services. For example, the proportion of budgets spent on materials of public libraries in 1977-78 was 14.6 percent and this has dropped to 12.7 percent in 1981-82. One reason that this can be done without affecting overall services much is that libraries are distinguishing and acquiring only frequently used materials and relying on interlibrary borrowing for infrequently used materials. The breakeven point of purchasing versus borrowing of periodicals is in the range of ten readings per year and many libraries are cancelling subscriptions to periodicals that are less frequently read. (Yet some academic libraries are reported to have 25 to 30 percent of their periodicals under the breakeven point.) In order to enhance interlibrary sharing of resources many networks have sprung up with automated systems designed to assist ILL through union ~~listings~~ databases and catalogs of holdings.

The great bibliographic utilities have also helped achieve enormous savings to libraries. Initially, provided with bibliographic data from the Library of Congress, catalog networks such as OCLC have fostered a means of reducing catalog, inc costs through shared

cataloging and they can now provide many other bibliographic services as well from their databases. Online retrieval of bibliographic records in science, engineering, law, medicine, and so on, have yielded substantial savings to libraries, as well as in providing more accurate, MORE COMPREHENSIVE AND MORE COST-EFFECTIVE searching. Finally, within libraries, microcomputers have provided libraries the opportunity to perform many functions such as acquisitions, circulation, cataloging, security, accounting and so on at substantial savings. In fact, libraries are very close to having totally integrated library automation systems that can perform many of these functions from a single bibliographic record database.

The number, 140,000 librarians, given previously refers to professional librarians in the U.S., but as mentioned earlier, information professionals requiring similar competencies are found in other working environments, such as information centers, clearinghouses, museums, etc., primarily to store and provide access to information. More recently we have begun to see a dispertion of information professionals to THE WORK UNITS OF ~~units where~~ the people they serve, ~~actually work~~. For example, some scientific research groups have an information professional within the group who is designated to serve the information needs of the group. The general trend is for the numbers of non-library information professional IN THESE positions to be increasing rapidly, whereas the number of library information professional positions will also increase, but not as rapidly unless THEY ARE educated differently BECAUSE OF THE NEED FOR SPECIALIZED SUBJECT KNOWLEDGE. The other information professionals who are involved in storage of, and access to, information seem to be experiencing a greater growth because of the extensive increase in

the volume of information materials generated, and because of an increasing public awareness of the value of information.

It is interesting to note that there are two other areas affecting growth in the information professions. The first is the ~~growth of~~ INCREASE IN usage of libraries and other types of information centers. This growth is exponential, in spite of the fact that the number of registered users of such services is not increasing ~~any~~ MUCH faster than the number of constituents served. Such a rapid growth in the uses of information services will require an increase in the numbers of information professionals needed to support such use. The other area of growth is in the range of services provided by the libraries and information centers, both in terms of the volumes and varieties of materials stored, and of the various services offered. For example, public libraries are constantly adding to their collections -- more books, more magazines, more films, more video cassettes, and now more computer software. They are also expanding their services to include such things as online searching, microcomputer access, word processing, etc. Corporate libraries in addition to storing the traditional books, periodicals, reports, etc., are now storing corporate financial, legal and personnel records, and providing access to them.

Because of the enormous accumulation of knowledge, it has been necessary to organize and control the information materials. This was done initially by classification and cataloging and later by other bibliographic means. Also, major projects in business and government began to become more and more mission-oriented rather than discipline oriented. This meant that teams of scientists,

engineers, statisticians, marketers, managers, social scientists, and other professionals worked together to attack such problems as product creation and development, space, energy, health, and environment. Thus, information to solve problems had to come from multi-disciplinary fields. This, combined with the huge amount of material from which to select ~~from~~ required new ways to identify and locate information sources. As a result, a whole new way of information handling came into being. Such information access is provided through secondary information where secondary information describes primary information and its sources, in order to gain access to the primary information. Whereas, primary information is the principal information used, such as that found in books and journal articles or data in computer files. Secondary information can be in the form of subject catalogs, indexes and abstracts which describe textual, numeric, graphic, and cartographic information. It is published in printed and electronic media containing bibliographic ~~(or reference)~~ and referral ~~(or directory)~~ information.

Secondary information, just as primary information, involves five basic functions of information transfer. There is creation and preparation of catalog information, indexes, and abstracts and items input. There is also recording, reproduction and distribution of published indexes and computer tapes prepared by abstracting and indexing services. Storage and access is provided through vendors (that provide secondary information from computer stores), libraries and information centers. Use of information is enhanced through information analysis centers and information intermediaries or brokers. There are estimated to be nearly 50 thousand professionals

found in the creation and preparation of secondary information in the U.S. These people are catalogers and indexers found in libraries; abstracters and indexers employed by over 2,500 abstracting and indexing services; and other creators found in specialized clearinghouses and information units that serve users in organizations such as companies or federal agencies. Many of these organizations also record, reproduce and distribute the secondary information and employ as many as 15,000 professionals who help edit, organize, and process secondary information. There is also an emerging industry of vendors of secondary information. For example, relatively large organizations ($10 to $100 million annual volume) developed to process secondary information electronically from requests submitted online. There are approximately 10,000 professionals involved in the storage and access of secondary information.

For a long time, information users have been helped by reference librarians. However, in the 1950's, particularly in the United Kingdom and then the U.S., scientific teams sub-divided responsibilities into activities such as design, laboratory work, and information search, retrieval and analysis. The latter people became known as information scientists (as opposed to laboratory scientists). Other fields such as medicine and law soon followed suit. Now there are over 100,000 information professionals whose principal work involves searching for data and information on behalf of others. These individuals diagnose user needs for information, identify data sources from hundreds of computerized databases and printed secondary and primary publications, and search using online computer systems or manually through published materials. They often

evaluate the results of searches and sometimes perform preliminary analyses. They are usually found in libraries or in the units served by them. There has recently evolved an industry of nearly 1,000 companies and individual entrepeneurs, sometimes called information brokers, who are largely devoted to searching, retrieval and analysis of secondary information. In addition to being called reference librarians these information professionals are often referred to as information scientists (regardless of the environment or discipline of user served), information specialists or information counsellors. Frequently, though, their titles bear the names of the profession they serve such as chemist or market researcher.

It is interesting to consider the emergence of the information scientist (or documentalist as they sometimes were called) as distinct from the reference librarian. One of the reasons for the distinction was that librarians traditionally provided access to documents. In other words, the end result of a reference query to a librarian was perceived as a document (or set of documents) in hand. The information scientist, on the other hand, was concerned with providing access to the information contained within the document. The tools associated with each type of access were, for a while, different. The reference librarian made use of the catalog and reference works, whereas the information scientist uses indexes and bibliographies. These distinctions were soon blurred, particularly with automation of printed indexes and the emergence of online bibliographic databases. However, some of the distinction has remained to the extent that librarians and information scientists are often considered to have different professional identities.

There have been several unfortunate consequences of two professional groups emerging within an organization. Examples exist of organizations which house both a library (staffed by librarians) and an information center (staffed usually by information scientists or technical information specialists) which are physically remote. The users of these units ~~would~~ WOULD goto the information center, for example, for a database search. Then, when the search is completed would have to travel to the library to see if the documents identified through the search were available or not. Sometimes the travel time between the two units is over one hour! Fortunately, we are beginning to see a trend towards the provision of "one-stop shopping", with all information activities in an organization located in one unit. Information resources management is a concept that has helped to coordinate information services in an organization.

One final reason for the emergence of two separate professional groups performing similar, if not identical sctivities results from the common perception of librarians and what they do. To many people the librarian is the person who checks books in and out SINCE THAT IS THEIR ONLY CONTACT. Therefore, many perceived the librarian's job to be more clerical in nature (and in fact SOME still do). All the behind the scenes activity such as selection, acquisitions, cataloging, classification, etc., is out of the public view. How many of us take the card catalogs for granted (that is, if we used it at all!)? Why then would we be inclined to trust librarians with the very complex task of finding information? This attitude has been most prevalent in scientific and technical environments, but is changing, albeit slowly. The change is being driven by increasing needs for information, increases

in the number of sources of information, and increased attempts by ~~the~~ SOME ultimate users of information to locate it for themselves.

With the very large number of information units found in industry, government, and educational institutions, a special line of work for about 275 thousand information professionals is management of these units. Not only are these people concerned with the information aspects of their organizations, but also with planning, directing, and administering information operations, programs, services, databases, or networks. Other support functions found in information units such as libraries, clearinghouses, database producers, and computer centers frequently follow the example of businesses. Such functions include public relations or marketing research, technology, and finance. Libraries have begun to conduct their operations in a more business-like manner, including charging for certain kinds of services or to non-proprietary customers, although this is a highly sensitive topic in the library profession and many librarians adamantly refuse to charge for THEIR services.

The extent of research and technology in the information field is also impressive in terms of numbers of professionals involved. There are over 100 thousand professionals engaged in information systems design. These people design new systems or modify existing ones. They also establish procedures for carrying out word processing, evaluate system output to ensure that it meets user requirements and document procedures for the use of systems. Well over double that number of professionals are engaged in information systems analysis which involves such activities as analyzing

information systems, determining their feasibility, evaluating systems, selecting data or information for inclusion in systems. Finally, a smaller, but significant number of professionals (about 20,000) perform information research and development. Researchers study the foundation, laws, theories, and postulates related to information and information systems, operations, programs, services, networks, or databases. Applied information research concerns the use of information systems, products or services and such things as information user behavior and characteristics.

Because the information field has grown so rapidly in recent years, it has been necessary to train information workers and professionals outside the traditional university and college environment. In fact, there are nearly ten times the number of persons educating and training information workers outside university environments (38,000) as in universities (4,000). This education and training is performed on the job, in in-house training departments, in workshops and seminars presented all over the world, and in companies that specialize in this activity. Professional information societies blossomed in the 1960's and 70's and many of them serve information professionals through continuing education programs, as well as through providing conferences and a wealth of publications.

All of the above information professionals (with the exception of some basic researchers) might be thought of as the practitioners within the information profession. However, an information profession also includes the formal education community found in universities and colleges, and scholars such as scientists. Likewise, we find that there are several emerging of information disciplines,

described thoroughly by Machlup and Mansfield. These are disciplines that have information as their focus and are the disciplines that the information professions draw upon.

There appear to be ten information disciplines including library science, information science, computer science, artificial intelligence, cognitive science, semiotics, lingusitics, cybernetics, system theory and information theory.

It is clear that we should consider WITHIN THE INF FIELD only those disciplines that have a reasonably well defined profession of researchers, eudcators and practitioners associated with them. The ten mentioned above seem to fulfill this criterion. Library science (or librarianship) involves the body of knowledge ~~gained~~ concerning all the functions and activities conducted in libraries or library-like environments. Research in this discipline includes classification theory; novel methods of information exchange (e.g., networking, online bibliographic systems, and resource sharing); modelling and computer simulation of information systems and networks; economic studies of libraries and library networks; and studies of user characteristics and behavior. Other research involves evaluation; planning and design of new technology (e.g., computing, telecommunications, video disks, etc.) THAT ARE applied to library environments.

A similar discipline is information science, which in the U.S. grew out of the documentation movement in the UK and evolved from the information professionals who served scientific projects as searchers of recorded information. The departure of documentalists

from librarianship got its impetus from the vast amount of new, documented information resulting from government approved research and development and from the influx of documents acquired from Germany and other nations following the end of World War II. Large documentation centers were developed to serve the nuclear research, space, defense, medicine, and similar scientific communities. The government also staked several scientific communities (e.g., chemistry, physics, engineering) to large sums of money to research, design and develop secondary bibliographic systems to handle information in their fields. From this activity evolved the information science discipline in the U.S. Research in this field now involves studies of computer search and retrieval; patterns of communication; modelling of all aspects of information transfer; human factors involved in the design of man/machine systems; economics of information systems; and the like.

CAN THERE BE ANY DOUBT CONCERNING THE FUTURE OF THE INFORMATION PROFESSION, INCLUDING LIBRARIANSHIP.

Three major factors have led to or resulted from the Information Age: new technology, social adaptation to information availability and use, and the emergence of new information professions (or modification of old ones). Continuing advances in communications technology, computer science, library and information science, and information systems promise substantial social and economic progress over the remainder of this century by making information more available, accessible and useful. There is every reason to believe that free societies have adapted reasonably well, thus far, to the threshold of the Information Age. However, as we progress further into the Information Age at an ever increasing rate we must be prepared to meet new challenges of how to distill information, organize and control it, maintain it for future use and rapdily

provide needed information at a reasonable cost. ~~This is~~ THESE ARE the challenge put to the information professions. In order to meet this challenge, the information professions must gain more extensive knowledge, develop new skills and adhere to professional attitudes concerning an ethic that could largely determine the future of democratic nations.

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It has been said many times that information is power, and we should never lose sight of this simple truth. The treasury of information has grown to an enormous size and it doubles about every ~~seventeen~~ fifteen years. Thus, between now and the end of the 20th century, the amount of knowledge known to man throughout history will more than double. No wonder that the information profession is rapidly becoming such an essential part of the new Age. Otherwise, a large portion of this information would be wasted or not properly employed. In order to serve all the diverse information needs of society ranging from the poor people of the world who seek information on how to cope with their special day-to-day problems to Nobel Prize winners who rely heavily on information to help them unravel the mysteries of the universe, information professionals must gain knowledge concerning their constituent's needs as well as knowledge about their own professional activities which is also rapidly changing due to new technology. They must also develop skills in processing information as well as in writing and communicating. Information professionals have a very special need to provide precise and accurate information as well as to ensure that information is available to everyone who needs it. It is a very difficult but essential task to be able to distill large amounts of information to small portions that accurately portray the entire

picture. Without a proper professional ethic it is too easy to become sloppy or to inject one's own judgement, opinion or attitude into the distilled information.

~~Finally,~~ we must also avoid making information available to some while denying access to others through overt or subtle means. The industrial nations of the world are information-rich. Yet, even in these information-rich environments, we must avoid risking the temptation to develop societies which have classes (or entire nations) of information-oriented people who have ready access to information at one extreme, and, at the other, those who do not or cannot use information they need because of real or artificial barriers to information. Many ~~persons~~ people may not be able to enjoy this wealth because they have information handicaps, lack incentives to use information, or are unaware of where and how to obtain needed information. Also, unless trends change many will be denied needed information simply because of illiteracy. We must avoid a situation in which millions of volumes of the world's literature and problem solving information are found within walking distance, but cannot be used because ~~persons~~ those who need information cannot read. Thus, information professionals have an additional responsibility of making people aware of information, how to get it and how to use it. ~~THESE ARE SOME OF THE CHALLENGES FOR OUR PROFESSION.~~

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Our Nation is truly blessed with many resources such as land and food, energy sources, minerals and people. Information is also beginning to be recognized as one of our most important resources. Information is created, processed and used by people. This is one of the reasons that I mentioned previously that one of our most

important resources is people. Yet, there is a dilemma concerning recognition of the relative contributions that various ~~persons~~ people make to society. There are many inexplicable inequities in life such as low price of essential or extremely useful things such as air, water and food compared to the high price commanded for such SEEMINGLY useless things as precious stones or pearls. A similar phenomenon holds for the extremely high remuneration of some professions such as those in entertainment and athletics compared to pay of such critical workers as teachers, police, firefighters, librarians, nurses and military. In our studies we have found extremely competent librarians motivated not so much by salary but rather by the kind of work they do and a sense of the importance of their work.

This is not to say that librarianship is a dead end profession because there is overwhelming evidence that this is not the case. There are many career paths open to librarians such as supervisory or management positions and high level positions outside of libraries. The knowledge, skills and attitude components of competencies required by librarians are beginning to be recognized as important characteristics for high level management and other such positions. More and more information professionals are rising to the top of their organizations and fields. Possibly, the extreme EXAMPLE is Andropov's taking over the leadership in Russia. Companies and government agencies are combining all information activities under single management and often the CHOSEN leader is a librarian. In our study of New Directions for Library and Information Science EDUCATION we have identified many instances of such advancement. A reference librarian is now in charge of training FOR of a large vendor. One librarian started providing reference services, began to help analyze and ~~unite~~ WRITE research reports

IN THE EARLY YEARS OF OUR COUNTRY WAS DOMINATED BY INVENTORS SUCH AS EDISON, LAND AND FORD. THEN COMPANIES

and is now in charge of an entire research group in a high technology R&D firm. Another person came to work as a librarian in a publishing firm and now is Executive Vice President. Leadership in companies tended to be led by marketing and advertising people and recently by financially trained ~~persons~~ people. At one time I thought this progression might pass on to lawyers, but regulation, which dominated AND SOME OTHER LEGAL ASPECTS lawyers' time has become less important. More recently, I am convinced that such leadership in the next 25 years will come from the information profession; particularly those engaged in information resource management. These people will have by far the best knowledge of their organizations as well as management experience and skills.

However, we also found many librarians and other information professionals who have preferred to remain throughout their entire career in specialties such as cataloging, indexing and abstracting or reference work because they like what they do. We have been highly impressed by the competencies of these people, yet it is difficult to justify LARGE raises every year OVER AN ENTIRE CAREER; even considering inflation. This presents a real problem because these information professionals are making a significant contribution to society.

The Federal government has recently attempted to downgrade REQUIREMENTS FOR ENTRY INTO THE LIBRARIAN SERIES ~~librarianship~~ and their libraries have been earmarked for contracting out. Evidence suggests that Federal librarians HAVE HIGHER SALARIES ~~make more~~ than librarians found in other environments, but this is true for most other KINDS OF GOVERNMENT workers as well. Contracting out is a quick-fix for the problem because contractors can hire new graduates to do the work INEXPENSIVELY then promote a few or let them go when they become too expensive.

What happens to the knowledge and skills of those ~~persons~~ INDIVIDUALS let go? Somehow we need to address this problem with our profession in a rational way and forget the retoric that suggests that this or that administration is out to get women, or that there is some evil hidden agenda involved as implied in a recent article in American Libraries.

It seems to me that we ~~must~~ do two things. First, we must make everyone aware of our TRUE contribution to society, particularly since library budgets will always compete with other services for resources. Secondly, we as professionals should maintain reasonable expectations as to what our careers can bring us in terms of position and remuneration.

I alluded to part of the budgetary problem in reference to the fact that funders tend to cop out by allocating budgets by number of constituents served, in lack of recognition of increasing demands on libraries. There has been some progress in assessing the value of information services and products. Hayes has demonstrated the positive correlation between AMOUNT OF information product and service purchased and profit or value-added in industries. Terlicki has formatted a model that shows the contribution of information MAKES to value-added in the telecommunications industry. Taylor has enumerated value-added factors associated with secondary information.

King Research has also performed several studies that show that the value of information and information services and products in science and technology is truly enormous. We attempted to measure value of information from several perspectives. The first perspective is that of the information users and this value is

measured by what they are willing to pay, in terms of money exchanged and in their time and effort involved in access and use. As an order of magnitude this comes to about $40 or $50 per reading of articles and technical reports. When one considers that there are about 300 million such readings annually this comes to about $12 billion. Another perspective is how the use of information affects the scientists' work. Here we find that reading scientific materials, on the average, saves scientists about $1,000 in time and equipment. Thus, over 300 million readings comes to A VALUE OF $300 billion. A higher level PERSPECTIVES OF value is how the work in turn affects the mission of the organization or society.

The question we have attempted to address is what contribution library services and products make to this value. Our approach to this question is that the total value, regardless of perspective, depends on amount of use of information. The more use of information, the greater its value. The amount of use in turn depends on a number of factors such as cost or price, quality of information, performance and attributes of primary services and products, and awareness; which is partially achieved by secondary services and products. It is abundantly clear that library services and products make a SIGNIFICANT ~~enormous~~ contribution to the value of scientific and technical information. This is undoubtedly true with information used by other professions as well and SUCH VALUE could be established, but with more difficulty, for the other uses of information mentioned at the beginning of my talk.

This observation leads to why I am extremely concerned about the imperative for excellence in the information profession. By excellence, I mean that a Librarian or other information professional

performs on the boundary of individual ability in ways that test and push back personal limits. While not fully recognized and not documented, there is little doubt that information professionals add substantially to the enormous value of information. The linkages are certainly demonstrable. Clearly, increase in competencies of librarians measured in terms of knowledge, skills and attitudes yields an increase in performance of their work, WHICH MEANS better library services and products, WHICH LEADS TO more use, greater value, better research, education, management and so on.

There is little doubt in my mind that our Nation's future will demand excellence in the information profession, regardless of endeavor served. The incredible increase in recorded information and information needs will make tremendous demands on the information community. In order to meet these demands, competencies of information professionals will need to be pushed to the boundaries of excellence. Knowledge will need to be more extensive, skills better honed and attitudes towards one's profession highly positive.

There are other factors that will also test the information profession as well. For example, while new technology has the effect of solving the problems of space and time, it also presents a major problem of quality of information. Some bibliographic database producers index at lower quality, assuming that inaccuracy of input can be overcome in searching. Many have suggested that electronic publishing will do away with the need for peer review. COMTEX, the first major electronic scientific publication, is based on this premise. Most data users are totally unaware of the quality of data provided them and quality in some instances has decreased to

an alarming level. It may well be that one of the most important contributions of information professionals will be to cope with the potential deterioration of information quality.

In order to achieve excellence, all the components of the information profession must be involved. The scholars and researchers must show the way. Educators will need to keep abreast of the profession's needs for knowledge, skills and attitudes. There will be special requirements for making sure that information professionals will continue to be as ingenious in designing their systems and in resource sharing. They must also be able to think through all the consequences of actions. Too many in our society think only of immediate aspects of actions without considering higher order effects. And above all, we must continue to instill an attitude of high professionalism.